



## UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/564,582	01/12/2006	Celine Juliette Detcheverry	NL03 0878 US1	3317
65913	7590	07/22/2009		
NXP, B.V.			EXAMINER	
NXP INTELLECTUAL PROPERTY & LICENSING			BAISA, JOSELITO SASIS	
M/S41-SJ			ART UNIT	PAPER NUMBER
1109 MCKAY DRIVE			2832	
SAN JOSE, CA 95131				
		NOTIFICATION DATE	DELIVERY MODE	
		07/22/2009	ELECTRONIC	

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

[ip.department.us@nxp.com](mailto:ip.department.us@nxp.com)

<b>Office Action Summary</b>	<b>Application No.</b> 10/564,582	<b>Applicant(s)</b> DETECHEVERRY ET AL.
	<b>Examiner</b> JOSELITO BAISA	<b>Art Unit</b> 2832

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
  - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
  - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED. (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 24 April 2009.
- 2a) This action is FINAL.      2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1-22 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 12 January 2006 is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All    b) Some \* c) None of:
1. Certified copies of the priority documents have been received.
  2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date: _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-146/08)         | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date: _____   | 6) <input type="checkbox"/> Other: _____                          |

**DETAILED ACTION**

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3, 5-7, 9 and 11-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ballantine et al. [6489663] in view of Minami [6730983].

Regarding claims 1 and 22, Ballantine discloses a substrate 12 having a first major surface, an inductive element 16 fabricated on the first major surface of the substrate 12, the inductive element 16 comprising at least one conductive line, a plurality of conducting vias (tilling) structures (30, 32) in at least one layer, wherein the plurality of conducting vias (tilling) structures (30, 32) are electrically connected together and arranged in a geometrical pattern so as to substantially inhibit an inducement of an image current in the conducting vias (tilling) structures by a current in the inductive element 16 [Col. 6, Lines 13-33, Figures 1 and 2].

Ballantine discloses the instant claimed invention discussed above except for the conducting vias mentioned as tilling structures.

Minami discloses studs 12 as dummy or tilling structures. Minami further disclose that the plurality of dummy structures arranged to improve manufacturability of semiconductor device [Col. 4, Lines 1-15, Figures 1and 2] and [Col. 2, Lines 1-20].

It would have been obvious to one having ordinary skill in the art at the time of the invention to use dummy structures as taught by Minami to the device of Ballantine.

The motivation would have been to suppress dishing due to CMP and maintain the Q-value of the inductor to a large value [Col. 4, Lines 5-15].

With respect to claim 22, the claim is rejected for reciting method/steps derived from the structure of the rejected claim 1 above.

Regarding claim 2, Minami discloses the tilling structures 12 being made from tilling structure material, wherein the plurality of tilling structures 12 are arranged in a pattern so that the amount of tilling structure material in an area closer to the inductive element (5, 7) is smaller than the amount of tilling structure material in an area farther away from the inductive element (5, 7) [see Figures 1 and 2].

Regarding claim 3, Ballantine discloses the conducting vias structures (30, 32) are located at different layers, each layer being arranged in a geometrical pattern so as to substantially inhibit an inducement of an image current in the conducting vias structures by a current in the inductive element 16 [Col. 6, Lines 13-33, Figures 1 and 2].

Ballantine discloses the instant claimed invention discussed above except for the conducting vias be mentioned as tilling structures and the structures is determined by a desired pattern density of the semiconductor device for improving at least one of a process window of lithography, uniformity of Chemical Mechanical Polishing removal rate and integrity of low-k dielectrics.

Minami discloses studs 12 as dummy or tilling structures. Minami further disclose that the plurality of dummy structure is determined by a desired pattern density of the semiconductor device for improving uniformity of Chemical Mechanical Polishing removal rate [Col. 4, Lines 1-15, Figures 1 and 2].

It would have been obvious to one having ordinary skill in the art at the time of the invention to use dummy structures as taught by Minami to the device of Ballantine.

The motivation would have been to suppress dishing due to CMP and maintain the Q-value of the inductor to a large value [Col. 4, Lines 5-15].

Regarding claim 5, Ballantine discloses the conducting vias (tilling) structures (30, 32) at different layers are electrically connected to each other [Col. 6, Lines 13-33, Figure 2].

Regarding claim 6, Ballantine discloses the conducting vias (tilling) structures (30, 32) are connected to a DC potential (through 26) [Col. 5, Lines 65-67, Figure 2].

Ballantine further discloses the tilling structures (30, 32) of geometrical pattern that does not substantially inhibit inductive coupling between the inductive element 16 and the substrate 12 [Col. 5, Lines 9-25].

Regarding claim 7, Ballantine discloses the conducting vias (tilling) structures (30, 32) are a plurality of slender elongate elements [Col. 5, Lines 65-67, Figure 1].

Ballantine further discloses the tilling structures (30, 32) of geometrical pattern that does not substantially block penetration into the substrate 12 of electric field lines generated by the inductive element 16 [Col. 5, Lines 9-25].

Regarding claim 9, Ballantine discloses the tilling structures (30, 32) are locally oriented perpendicular to the at least one conductive line of the inductive element 16 [see Figure 1].

Regarding claim 11, Ballantine discloses a ground shield 26 for shielding the inductive element 16 from a further layer [Col. 5, Lines 65-67, Figure 2].

Regarding claim 12, Ballantine discloses the further layer is the substrate 12 [Col. 5, Lines 31-67, Figure 2].

Regarding claim 13, Ballantine discloses connection means electrically connecting the plurality of conducting vias (tiling) structures (30, 32) with the ground shield 26 without creating a conductive loop [Col. 5, Lines 31-67, Figure 2].

Regarding claim 14, Minami discloses the tilling structures 12 are formed in a region other than a region directly below the inductive element (5, 7) [Col. 4, Lines 1-15, Figures 1 and 2].

Regarding claims 15 and 16, Ballantine discloses a passive element, which is a capacitive element [Col. 5, Lines 31-55].

Regarding claim 17, Ballantine discloses the capacitive element comprises two capacitor electrodes at least one of the capacitor electrodes being formed by a plurality of conducting vias (tilling) structures (30, 32) [Col. 5, Lines 31-60].

Regarding claim 18, Ballantine discloses a capacitor electrode formed by a plurality of conducting vias (tilling) structures (30, 32) leads to a metal or polysilicon region density in the inductor vicinity respecting the design rules of advanced IC technologies [Col. 5, Lines 17-30].

Regarding claim 19, Ballantine discloses one capacitor electrode of the capacitive element is formed by the ground shield 26 [Col. 5, Lines 16-55].

Regarding claim 20, Ballantine discloses the integration of the capacitive element with the inductive element 14b is optimized to respect the metal pattern density in advanced silicon technologies [Col. 5, Lines 16-55].

Regarding claim 21, Ballantine discloses the distance between the capacitive element and the inductive element 16 is large enough to avoid a dominant fringe coupling between them [Col. 5, Lines 16-65].

Claims 4, 8 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ballantine in view of Minami as applied to claim1 above, and further in view of Kuroda et al. [6693315].

Ballantine in view of Minami discloses the instant claimed invention discussed above except for the tilling structures are plurality of substantially triangular elements.

Kuroda discloses dummy structures are substantially triangular elements [Col. 17, Lines 33-39].

It would have been obvious to one having ordinary skill in the art at the time of the invention to use triangular shape dummy pattern as taught by Kuroda to the structure of Ballantine in view of Minami.

The motivation would have been to provide flatness of the member surface embedded regardless of the shape of the dummy pattern [Col. 14, Lines 40-45].

Regarding claim 10, Ballantine discloses the elements of the conducting vias (tiling) structures are locally oriented perpendicular to the at least one conductive line of the inductive element 16 [ see Figure 1].

Regarding claim 4, Ballantine in view of Minami discloses the instant claimed invention discussed above including dummy patterns in different layers except for the geometrical pattern of tilling structures at two different layers is different in shape.

Kuroda discloses geometrical pattern of dummy structures can be of any shape [Col. 17, Lines 33-39].

It would have been obvious to one having ordinary skill in the art at the time of the invention to use dummy patterns of different shape as taught by Kuroda to the different layer of Ballantine in view of Minami.

The motivation would have been to provide flatness of the member surface embedded regardless of the shape of the dummy pattern [Col. 14, Lines 40-45].

***Response to Argument***

Applicant's arguments with respect to claims 1-22 have been considered but are not persuasive.

Applicant argues that Ballantine does not teach tilling structures arranged in geometrical pattern so as to substantially inhibit the inducement of an image current in the tilling structures by a current from an inductive element. The examiner disagrees.

The vias 28 are arranged perpendicularly on rows of ground strips 26 and have the vias one end connected commonly on the ground strip. This configuration will inhibit the inducement of an image current from an inductive element. The current is directed to the grounding strip [Col. 6, Lines 59-64].

Minami teaches arranging tilling structure pattern in a configuration that the amount of tilling structure material in an area closer to the inductive element is smaller as seen in Figure 1 and 3. Minami is concern about the Q-value of the inductor [Col. 4, Lines 43-50]. This teaching of Minami relays to the concern of Ballantine with regards to configuring its vias 28 for maximizing Q-value of the inductor [Col. 5, Lines 52-64].

With regards to claims 6 and 7, Ballantine discloses the tilling structure (30, 32) or the vias 28 of geometrical pattern does not substantially inhibit inductive coupling between the inductive element 16 and the substrate 12 [Col. 5, Lines 9-25]. The tilling structures are connected with grounding element 26. The grounding element 26 terminates the current going

Art Unit: 2832

through vias (tilling structure) 28 /(30, 32). The tilling structure (30, 32) does not substantially block penetration of electric field lines from inductive element 16 to substrate 12. Similar to the Applicant's invention (page 10, lines 1-20), the grounding shield 22 inhibits coupling between inductive element and substrate and not the tilling structures itself.

With regards to claims 17 and 19, Applicant also argues that vias 28 does not form one electrode element of a capacitive element and the grounding strip 26 does not form the other electrode. The examiner disagrees.

Each of vias 28 or grounding strip 26 forms an electrode of a capacitive element with the conductive element of inductor 16.

### ***Conclusion***

The applicant's amendment has been fully considered. Accordingly, THIS ACTION IS MADE FINAL. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joselito Baisa whose telephone number is (571) 272-7132. The examiner can normally be reached on M-F 5:30 am to 2:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Elvin Enad can be reached on (571) 272-1990. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Elvin G Enad/  
Supervisory Patent Examiner, Art Unit 2832

Joselito Baisa  
Examiner  
Art Unit 2832

/J. B./  
Examiner, Art Unit 2832

Application/Control Number: 10/564,582

Art Unit: 2832

Page 11